

CLAIMS

1. A process for the conversion of a solid starting iron compound selected from the group consisting of iron oxides, iron hydroxides, iron oxyhydroxides, and mixtures thereof into a solid product iron compound, the solid product iron compound having different physical, chemical, and/or structural properties from the solid starting iron compound, which process comprises the steps of:
 - a) dispersing the solid starting iron compound in a liquid thus forming a suspension, and
 - b) feeding the suspension continuously through one or more agitated conversion vessel(s), in which vessel(s) the solid starting iron compound is converted into the solid product iron compound under hydrothermal conditions.
2. The process of claim 1 wherein the liquid is water and the temperature in the conversion vessel(s) ranges from 150 to 375°C.
3. The process of claim 1 wherein the suspension is fed to the conversion vessel(s) with a throughput of 0.01-10 l/min.
4. The process of claim 3 wherein the throughput is 0.1-3 l/min.
5. The process of claim 1 wherein the solids to liquid ratio of the suspension at the start of step b) ranges from 0.05 to 0.25.
6. The process of claim 1 wherein the solids to liquid ratio of the suspension at the end of step b) ranges from 0.03-0.22.

7. The process of claim 1 wherein the solids content of the suspension at the end of step b) deviates from the solids content of the suspension at the start of step b) by less than 40%.
- 5 8. The process of claim 7 wherein the solids content of the suspension at the end of step b) deviates from the solids content of the suspension at the start of step b) by less than 25%.
9. The process of claim 8 wherein the solids content of the suspension at the end of
10 step b) deviates from the solids content of the suspension at the start of step b) by less than 10%.
10. The process of claim 1 wherein the solid starting iron compound is an iron ore, a synthetic iron product, or a precipitated iron salt.
- 15 11. The process of claim 10 wherein the solid starting iron compound is an iron ore selected from the group consisting of goethite, akaganeite, bernalite, feroxyhyte, ferrihydrite, lepidocrocite, limonite, maghemite, magnetite, hematite, and wustite.
- 20 12. The process of claim 1 wherein an additive-containing solid starting iron compound is used.
13. The process of claim 1 wherein an additive is added to the suspension during step a) and/or step b).
- 25 14. The process of claim 1 wherein the solid product iron compound has a higher porosity and/or surface area than the solid starting iron compound.

15. The process of claim 1 wherein the suspension in step b) is fed through a series of from two to five conversion vessels.

5 16. The process of claim 1 wherein the suspension flows substantially upward through the conversion vessel(s).

17. The process of claim 1 wherein the suspension is agitated in step b) by exerting axial forces on the suspension.